Revue suisse Zool.	Tome 84	Fasc. 1	p. 247-274	Genève, mars 1977

Neue und interessante Milben aus dem Genfer Museum XX[1] Contribution to the Oribatid Fauna of S.E. Asia *(Acari, Oribatida)*

by

S. MAHUNKA

With 48 figures

ABSTRACT

From 12 soil samples, collected in Malaysia and Indonesia and extracted by Berlese funnels in Geneva, the Oribatids had been studied. 40 species and subspecies could be identified, 15 of them are described as new for science *(Aedoplophora grandjeani, Cosmochthonius sublanatus, Sphaerochthonius longisetus, Cryptacarus schauenbergi, Heptacarus piffli, Heptacarus reticulatus, Eremaeozetes costulatus, Eremulus berlesei, Eremobelba heterotricha, Machuella zehntneri, Striatoppia hammeni, Nixocetes javanus, Pilobatella schauenbergi, Rostrozetes komodensis* and *Lamellobates hauseri)* and a new genus *(Nixocetes)* is erected for one of them. Keys for all species of the genera *Heptacarus* and *Machuella* are given, the species *Cosmobates brevisetus* Bal. and *Cosmobates gregoryi* Bal. are transfered in the new genus *Nixocetes* and the synonymy of *Paralamellobates shoutedeni* (Bal.) with *Paralamellobates ceylanicus* (Oudem.) established.

---

[1] I. Angaben über die Tarsonemina-Fauna (Acari) aus Kephallinia, Griechenland. (*Biol. Gallo-Hellenica* 4: 71-83, 1972).

II. Anoetiden (Acari) aus Kephallinia, Griechenland. (*Revue suisse Zool.* 78: 1195-1200, 1971).

III. *Zambedania* gen. nov. und zwei neue Milben-Arten aus Rhodesien (Acari: Tarsonemina). (*Bull. Soc. ent. suisse* 45: 151-155, 1972).

IV. Tarsonemina-Arten aus Ceylon (Acari). (*Archs. Sci. Genève* 24: 391-402, 1971).

V. *Ceylanoetus excavatus* gen. nov., sp. n. und andere neue Anoetida-Arten aus Ceylon. (*Acarologia* 15: 506-513, 1974).

VI. New Scutacarid mite species (Acari: Tarsonemina) from Malaysian soils. (*Redia* 53: 303-312, 1973).

VII. Acariden und Anoetiden (Acari) aus Griechenland. (*Revue suisse Zool.* 79: 947-958).

INTRODUCTION

Several papers have already been published on the Oribatid fauna of SE Asia, and especially of the Indonesian archipelago; some of them by authors to be regarded as the classics by now (Berlese, Oudemans, Sellnick, Willmann, etc.). Since these contributions are now partly obsolete, or the descriptions hardly identifiable, the documentary material lost, destroyed, or unavailable, the study of materials deriving from recent collections in this region may considerably assist the solving of taxonomical, systematical, and zoogeographical problems.

Acting on these considerations, Dr. B. Hauser, Curator at the Muséum d'Histoire naturelle, Genève, asked his colleague, Dr. P. Schauenberg to take Berlese samples of soil habitats during his prolonged visit in the region under discussion. P. Schauenberg collected a very rich material in 12 localities, several samples from Malaysia and Java, and each from the smaller islands. I propose to submit the list of these sites below, and to refer only to their code numbers (identical with the inventory numbers of the Geneva Museum) in the discussion of the species.

LIST OF LOCALITIES

As-73-1 : Malaysia: Teman Negara National Park, 240 m, climax lowland rainforest, 27.VI.1973.

As-73-2 : Indonesia: Bali: Denpasar, palms in 150 m distance from the sea shore, 29.VI.1973.

As-73-3 : Indonesia: Eastern Java: Baluran game reserve, 100 m, dry forest, basaltic soil, 4.VII.1973.

As-73-4 : Indonesia: Western Java: Udjong-Kulon, 8 m, climax lowland rainforest, 8.VII.1973.

As-73-5 : Indonesia: Krakatau: Anak Krakatau, rest of destroyed vegetation in recent ash (eruption of April 1973), 9.VII.1973.

VIII. Tarsonemina-Arten (Acari) aus Griechenland. (*Biol. Gallo-Helenica* 5: 209-225, 1974).

IX. Otocepheid species from Ceylon (Oribatida). (*Redia* 54: 83-103, 1974).

X. Milben aus Kleinsäugernestern Nordtirols (Österreich) (Acari: Tarsonemida, Acarida und Oribatida). (*Ber. nat.-med. Ver. Innsbruck* 59: 47-62, 1972).

XI. Oribatiden aus Rhodesien (Acari). (*Archs. Sci. Genève* 26: 205-225, 1974).

XII. Beitrag zur Kenntnis der Oribatiden-Fauna Griechenlands (Acari). (*Revue suisse Zool.* 81: 569-590, 1974).

XIII. Neue Oribatiden-Arten (Acari) aus Senegal. (*Bull. I.F.A.N.* 37: 288-296, 1975).

XIV. Tarsonemida aus Hong-Kong (Acari). (*Archs. Sci. Genève* 28: 183-188, 1975).

XV. Beitrag zur Tarsonemiden-Fauna von Südindien (Acari). (*Revue suisse Zool.* 82: 495-506, 1975).

XVI. Über einige Oribatiden (Acari) von den Seychellen. (*Bull. Soc. ent. suisse* 50: 63-65, 1977).

XVII. Data to the Oribatid (Acari) Fauna of Cameroun. I. (*Ann. Fac. Sci. Cameroun* 18: 43-70, 1974).

XVIII. Oribatiden aus Hong-Kong (Acarina). (*Acarologia* 18: 360-372, 1976).

XIX. Einige Angaben zur Kenntnis der Milbenfauna der Ameisennester. (*Archs. Sci. Genève* 30: 91-106, 1977).

As-73-6 : MALAYSIA: Kuala Lumpur: city park, 2.X.1973.
As-73-7 : INDONESIA: Komodo: 3 m, under shrubs, 7.X.1973.
As-73-8 : INDONESIA: Komodo: 12 m, under ratan palms (*Borassus* spec.), 8.X.1973.
As-73-9 : INDONESIA: Sumbawa: open scrub land, salt soil, 12.X.1973.
As-73-10: INDONESIA: Lombok: near airport, 5 m, 12.X.1973.
As-73-11: INDONESIA: Java: Surabaya, near city, scrub land, 13.X.1973.
As-73-12: INDONESIA: Western Java: Udjong-Kulon: Pulau Peutjang Island, 2 m, lowland rainforest, 16.X.1973.

I was able to identify a total of 40 species. Despite this relatively high number, there remained certain species (principally in the *Scheloribates-Xylobates* group) requiring further study—these will not be treated here. Of the species listed, those relegable to the genera *Sphaerochthonius* and *Cosmochthonius* may undergo revision after a study of the type specimens of the related forms, especially as regards *Cosmochthonius emmae* (Berlese, 1910) and *Sphaerochthonius gemma* (Oudemans, 1909).

I also think that further study is needed concerning the identity of *Microzetes auxiliaris* Grandjean, 1936, *Fosseremus quadripertitus* Grandjean, 1965, *Licneremaeus novaeguineae* Balogh, 1968, and especially of *Basilobelba retiarius* (Warburton, 1912); several species or subspecies may presumably lie hidden under these names.

Concerning the faunas of the several localities, no essential connections or differences could be established. For such comparative purposes, the material was still to small on one hand, and the habitats themselves could not always be securely identified on the other. The specific paucity of only the Krakatau island was rather conspicuous, or rather only far-ranging species were proved to occur there.

I propose to submit first the complete list of species, followed by a discussion of the new species, or of those meriting remarks owing to their rarity or hardly known status.

I am deeply indebted to Dr. B. Hauser and Dr. P. Schauenberg for having made the material available to study and for all their endeavours to collect the material and to promote its elaboration.

LIST OF THE SPECIES

Prothoplophoridae Ewing, 1917

Aedoplophora grandjeani sp. nov.

Localities: As-73/4; As-73/8.

Parhypochthonidae Grandj., 1932

Parhypochthonius sphidinus (Berlese, 1904)

Localities: As-73/7; As-73/9.

Hypochthoniidae Berl., 1910

Eohypochthonius gracilis Jacot, 1936

Localities: As-73/6; As-73/10; As-73/12.

Eohypochthonius gracilis crassisetiger Aoki, 1959

Locality: As-73/6.

Malaccangelia remigera Berl., 1913

Locality: As-73/6.

Cosmochthoniidae Grandj., 1947

Cosmochthonius emmae (Berl., 1910)

Localities: As-73/3; As-73/7.

Cosmochthonius sublanatus sp. nov.

Locality: As-73/3.

Sphaerochthoniidae Grandj., 1947

Sphaerochthonius gemma (Oudemans, 1909)

Locality: As-73/8.

Sphaerochthonius longisetus sp. nov.

Localities: As-73/7; As-73/8.

Lohmaniidae Berlese, 1916

Annectacarus africanus Balogh, 1961

Locality: As-73/8.

Cryptacarus schauenbergi sp. nov.

Localities: As-73/6; As-73/10.

Heptacarus piffli sp. nov.

Locality: As-73/9.

Heptacarus reticulatus sp. nov.

Locality: As-73/7.

Javacarus granulatus Csiszár, 1961

Locality: As-73/12.

Javacarus kuehnelti Bal., 1961

Localities: As-73/4; As-73/6.

Lepidacarus ornatissimus Csiszár, 1961

Locality: As-73/2.

Meristacarus rubescens (Can., 1897)

Localities: As-73/1; As-73/4; As-73/6.

Trhypochthoniidae Willm., 1931

Allonothrus schuilingi Hammen, 1953

Locality: As-73/7.

Archegozetes longisetosus Aoki, 1965

Locality: As-73/6.

Eremaeozetidae Bal., 1972

Eremaeozetes costulatus sp. nov.

Locality: As-73/2.

Microzetidae Grandj., 1936

Microzetes auxiliaris Grandj., 1936

Localities: As-73/6; As-73/7; As-73/10.

Eremulidae Grandj., 1965

Eremulus berlesei sp. nov.

Locality: As-73/8.

Dameolidae Grandj., 1965

Fosseremus quadripertitus Grandjean, 1965

Localities: As-73/1; As-73/6; As-73/8; As-73/12.

Eremobelbidae Bal., 1961

Eremobelba heterotricha sp. nov.

Locality: As-73/1.

Basilobelbidae Bal., 1961

Basilobelba retiarius (Warb., 1912)

Localities: As-73/2; As-73/5; As-73/6; As-73/7.

Tectocepheidae Grandj., 1954

Tegeozetes tunicatus Berlese, 1913

Locality: As-73/12.

Opiidae Grandj., 1954

Machuella zehntneri sp. nov.

Locality: As-73/6.

Oppia kuehnelti Csiszár, 1961

Locality: As-73/7.

Stachyoppia processigera Bal.-Mah., 1967

Locality: As-73/5.

Striatoppia hammeni sp. nov.

Localities: As-73/10, As-73/12.

Machadobelbidae Bal., 1972

Machadobelba tuberculata Csiszár, 1961

Locality: As-73/12.

Licneremaeidae Grandj., 1931

Licneremaeus novaeguineae Bal., 1968

Localities: As-72/2; As-73/7; As-73/8.

Haplozetidae Grandj., 1936

Nixozetes javanus gen. nov. sp. nov.

Locality: As-73/12.

Perxylobates vermiseta (Bal.-Mah., 1968)

Locality: As-73/11.

Pilobatella schauenbergi sp. nov.

Locality: As-73/6.

Rostrozetes foveolatus Selln., 1925

Locality: As-73/7.

Rostrozetes komodensis sp. nov.

Locality: As-73/7.

Oribatellidae Jacot., 1925

Lamellobates hauseri sp. nov.

Localities: As-73/2; As-73/3; As-73/8; As-73/9.

Lamellobates orientalis Csiszár, 1961

Locality: As-73/2.

Paralamellobates ceylanicus (Oudms., 1915)

Locality: As-73/5.

DESCRIPTIONS AND DISCUSSIONS

Aedoplophora grandjeani sp. n. (fig. 1-4)

Dimensions: notocephalic length: 225 μ, greatest width: 152 μ; greatest notogastral width: 225 μ.

Dorsal side: Rostrum rounded, behind its prodorsal margin seakly concavely arcuate (fig. 1). Rostral hairs long, apically meeting, throughout ciliate. All other hairs minute. Sensillus (fig. 2) throughout uniformly incrassate, sortly pointed, dorsally with elongate cilia. Chaetotaxy of notogaster as in *Aedoplophora glomerata* Grandj., 1932.

Ventral side: Genital plate characteristically polygonal, ornamented with longitudinal lines, with 10 pairs of thin genital hairs. Anal plate smaller, punctate, its surface with 4, laterally with 6 smaller, thin hairs (fig. 3, 4).

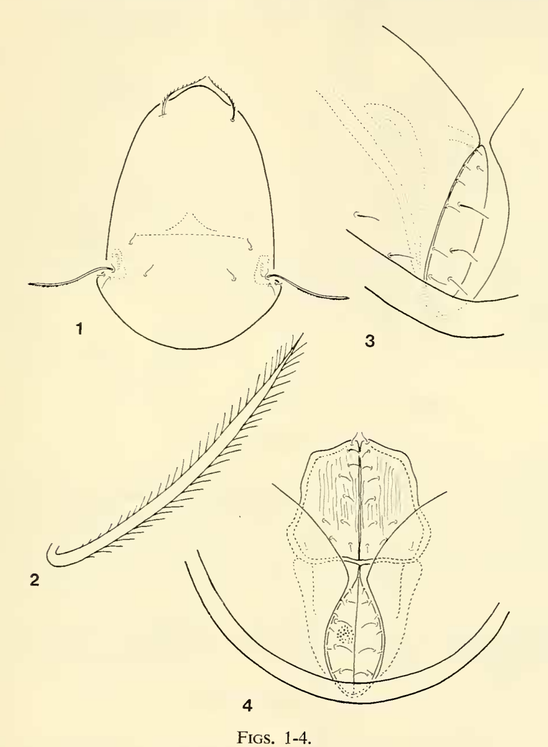
Legs: tridactylous (as in type-species), lateral claw 2 longer but thinner.

Examined material: 1 ex. (Holotype): As-73/8; 2 ex. (Paratypes): data as for the holotype; 2 ex. (Paratypes): As-73/4. Holotype and 2 paratypes deposited in the

Muséum d'Histoire naturelle, Genève; 2 paratypes (0-1358-74) in the Hungarian Natural History Museum, Budapest.

Remarks: Only the type-species, collected in Venezuela and Colombia, was known so far. The new species seems closely related, but in the type-species the sensillus is clavately incrassate, smooth, the rostral setae are at most twice longer than the lamellar or interlamellar hairs, their apices never even approaching each other medially.

The new species is respectfully dedicated to the late Prof. E. Grandjean.



Figs. 1-4.

Aedoplophora grandjeani sp. n.,

1: prodorsum, 2: sensillus, 3: anogenital region, 4: analplate.

Eohypochthonius gracilis (Jacot, 1936)

The type-species, demonstrated from several localities since its description, and also thoroughly reviewed by Beck (1962), was rather frequent in the materials studied.

Localities: As-73/6; As-/73/10; As-73/12.

Eohypochthonius gracilis crassisetiger Aoki, 1959

In one of the materials examined, there occurred a much wider form, together with the type-species, with phylliform notogastral hairs, completely agreeing with Aoki's (1965) description. It is questionable, however, if this form is not identical with *E. asiaticus* (Berlese, 1910) described from Java. According to Hammen (1959), the type-specimen is very badly preserved, requiring further investigations.

Locality: As-73/6.

Cosmochthonius emmae Berlese, 1910 (fig. 8-9)

Berlese described the species on the basis of specimens originating from Italy; since then, it was found, among others, also in Hungary (cf. Hammen 1959). The specimens collected on the Komodo Islands could be compared with these latter ones. The sole and slight differences appear to be in the length of the cilia borne on the phylliform setae, as well as in the shape of the leaves and their venation (fig. 8, 9). However, the specimens from the Komodo Islands, with their shorter cilia, stand nearer to the figures published by Berlese, therefore the assessment of this form as a new taxon would, without an examination of the type-specimens, be unjustified.

Localities: As-73/3; As-73/7; As-73/8.

Cosmochthonius sublanatus sp. n. (fig. 5-6)

Dimensions: length: 273-294 μ; width: 147-160 μ.

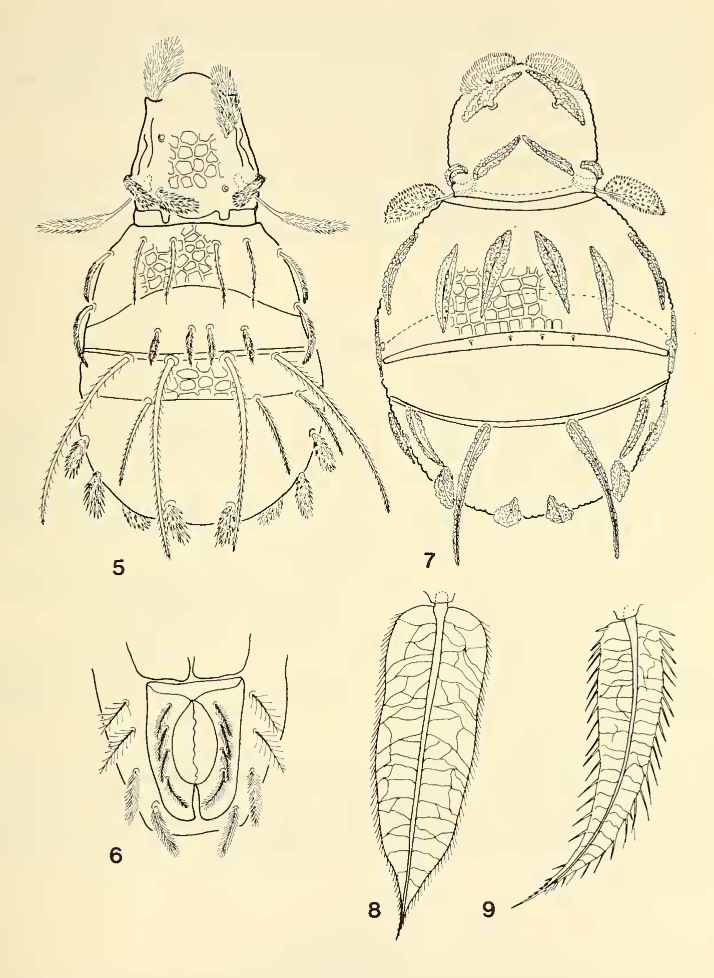
Dorsal side (fig. 5): Prodorsal hairs with long hairs, all resembling those of its congeners. Rostral hair arising on a sharply delimited protuberance. Notogastral hairs c_1-c_2 sparsely, c_3 and d_1-d_3 densely plumose. Hairs e_1-e_2 extraordinarily robust, long, thick, with sparse lateral cilia; hairs f_1-f_2 also similar in structure, but considerably shorter, f_1 at most half as long as e_1, and hair f_2 even shorter. All posteriorly situated other notogastral setae typically hirsute, like a brush.

Ventral side: All hairs originating on genital and anal plates ciliate (fig. 6). Plates with a polygonal sculpture, 4 pairs of anal and 4 pairs of adanal hairs, with ever denser lateral cilia towards end of body.

Legs: Leg I with 2 claws, legs II, III, IV tridactylous; median claw thick, lateral ones quite thin.

Examined material: 1 ex. (Holotype): As-73/3; 3 ex. (Paratypes): data as for holotype. Holotype and 2 paratypes deposited in the Muséum d'Histoire naturelle, Genève; 1 paratype (0-1354-74) in the Hungarian Natural History Museum, Budapest.

Remarks: The new species belongs in the alliance of *C. lanatus* Mich., 1885, differring from it and from the allied species primarily by the great difference in length between the hairs *e* and *f*, the differently shaped and ciliated hairs c_1-c_2 and c_3, respectively. The polygonal structure resembles that of *C. reticulatus* Grandjean, 1947, but in this latter the hairs c_3, d_1 and d_2 are not incrassate, and the difference between the setae *e* and *f* is also smaller.



FIGS. 5-9.

Cosmochthonius sublanatus sp. n.,
5: dorsal side, 6: anogenital region.
Sphaerochthonius longisetus sp. n., 7: dorsal side.
Cosmochthonius emmae Berl., 1910, 8-9: notogastral hairs.

Sphaerochthonius gemma (Oudemans, 1909)

There were two *Sphaerochthonius* species present in the soil samples collected on the Komodo; one of them is described below as a new species, the other stands near *Sph. splendidus* (Berl., 1904) and is provisionally identified as such, since I have no opportunity to study the type-specimens.

The exemplars collected on the Komodo are highly similar to the European specimens of *Sph. splendidus*, but the hairs c_1-c_2, aligned with the longitudinal axis of the body, are hardly shorter than the width of segment C. The well discernible, extremely thin, hairs *d* (?) are considerably longer than those of *Sph. longisetus* sp. n. Hairs *e* and *f* are comparatively short.

Locality: As-73/8.

Sphaerochthonius longisetus sp. n. (fig. 7)

Dimensions: length: 360-374 μ, width: 197-212 μ.

Dorsal side (fig. 7): The polygonal sculpture, a characteristic of the genus, recognizable in interlamellar region of notocephale, and on entire notogastral surface. Among prodorsal hairs, rostral setae especially long and wide, being considerably longer and wider than all other ones. Also lamellar, interlamellar, and exobothridial hairs characteristic. Sensillus long, wide, flat; densely aciculate. Notogaster with setae *c* normally "T"-shaped, hairs *d* minute [1], hairs *e* elongately phylliform, hair e_1 especially long, projecting beyond even posterior margin of body.

Ventral side: Highly resembling *Sph. transversus* Wallwork, 1960, described from Ghana. Stems of "T"-hairs around anal opening extremely elongated.

Legs: all legs tridactylous, median claw invariably thicker than lateral ones.

Examined material: 1 ex. (Holotype): As-73/8; 5 ex. (Paratypes): data as for holotype; 3 ex. (Paratypes): As-73/7. Holotype and 5 paratypes deposited in the Muséum d'Histoire naturelle, Genève, 3 paratypes (0-1350-74 and 0-1351-74) in the Hungarian Natural History Museum, Budapest.

Remarks: As already mentioned when discussing *Sph. gemma* (Oudemans, 1909), there are still some unsolved problems concerning the genus. However, the extremely long and thin notogastral hairs, characteristic to the species, are not present in any known congener. Wallwork mentions, when treating the tritonymph of *Sph. transversus*, that the hairs *e* are not T-shaped, but elongate. Still, these are considerably shorter, and the imagos here examined were doubtless imagos.

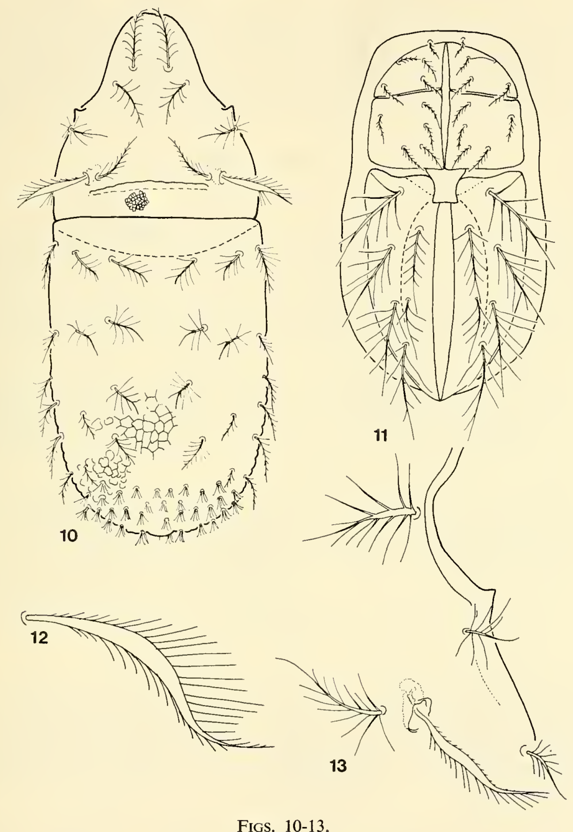
Cryptacarus schauenbergi sp. n. (fig. 10-13)

Dimensions: length: 349-370 μ; width: 148-160 μ.

Dorsal side (fig. 10): Rostrum straightly truncate or weakly concave. A sharp cuspis before hair *exa* on sides of propodosoma (fig. 13). Sensillus (fig. 12) basally thin,

[1] The specimen illustrated here was in a strongly swollen condition, causing the rupture of the suture. In the other specimen, this area is situated below segemnt C, extending to the basis of the alongately phylliform hairs. However, the minute hairs *d* (?), originating on the anterior margin of the segment, are well discernible even under segment C.

rapidly thickening, and gradually attenuating apicad, with about 40 lateral cilia in two rows, their length gradually increasing and then decreasing. Prodorsal hairs shaped like a fir-tree, lateral branches longest near the insertional points, then gradually decreasing. Notogaster with distinct polygonal sculpture, interspaces convex.



FIGS. 10-13.

Cryptacarus schauenbergi sp. n.,

10: dorsal side, 11: anogenital region, 12: sensillus, 13: prodorsum lateral side.

Ventral side: Epimeral region with all hairs heavily ciliate, partly resembling dorsal setae. Anogenital region (fig. 11) conforming with that of *Cryptacarus tuberculatus* Csiszár, 1961, though with a recognizable border between anal and adanal plates.

Examined material: 1 ex. (Holotype): As-73/6; 6 ex. (Paratypes): data as for holotype; 7 ex. (Paratypes): As-73/10. Holotype and 9 paratypes deposited in the Muséum d'Histoire naturelle, Genève; 4 paratypes (0-1349-74) in the Hungarian Natural History Museum, Budapest.

The new species is dedicated to Dr. P. Schauenberg, the collector of the priceless material.

Remarks: The only known Javanese representative of *Cryptacarus* [1] Grandjean, 1952, is *C. tuberculatus* Csiszár, 1961. In this latter species, the hairs c_1-c_2, d_1-d_2 and e_1-e_2 are short, and some of them completely smooth. In the type-species, *C. promecus* Grandjean, 1952, from North Africa, the shape and proportions of these hairs are also different.

Heptacarus [2] **piffli** sp. n. (fig. 14-16)

Dimensions: length: 786-810 μ; width: 396-421 μ.

Dorsal side (fig. 14): Prodorsum with less, notogaster with well discernible polygonal sculpture; majority of polygonal fields also with a roughly granulour sculpture, embracing some sparse and irregularly scattered pore fields (fig. 16). Prodorsal hairs thin, densely ciliate. Sensillus slightly incrassate, one side with about 14 long, the other side with some minute cilia. Anterior hairs (*c-d*) of notogaster considerably shorter than those originating on posterior side of body; pygidial neotrichy weak.

Ventral side: infracapitulum with 4 pairs of hairs. Epimeral region without neotrichy; hairs 1*a*, 2*a*, 3*a*, originating in median line of body, shorter than those on margin. All hairs of anogenital region ciliate (fig. 15). No essential difference in length among those originating on genital plate; anal hairs of equal length, while adanal hairs gradually lengthening towards end of body.

Examined material: 1 ex. (Holotype): As-73/9; 1 ex. (Paratypes): data as for holotype. Holotype deposited in the Muséum d'Histoire naturelle, Genève; paratype (0-1362-74) in the Hungarian Natural History Museum, Budapest.

Remarks: Differential diagnosis given after the description of *H. reticulatus* sp. n., below.

Heptacarus reticulatus sp. n. (fig. 17-19)

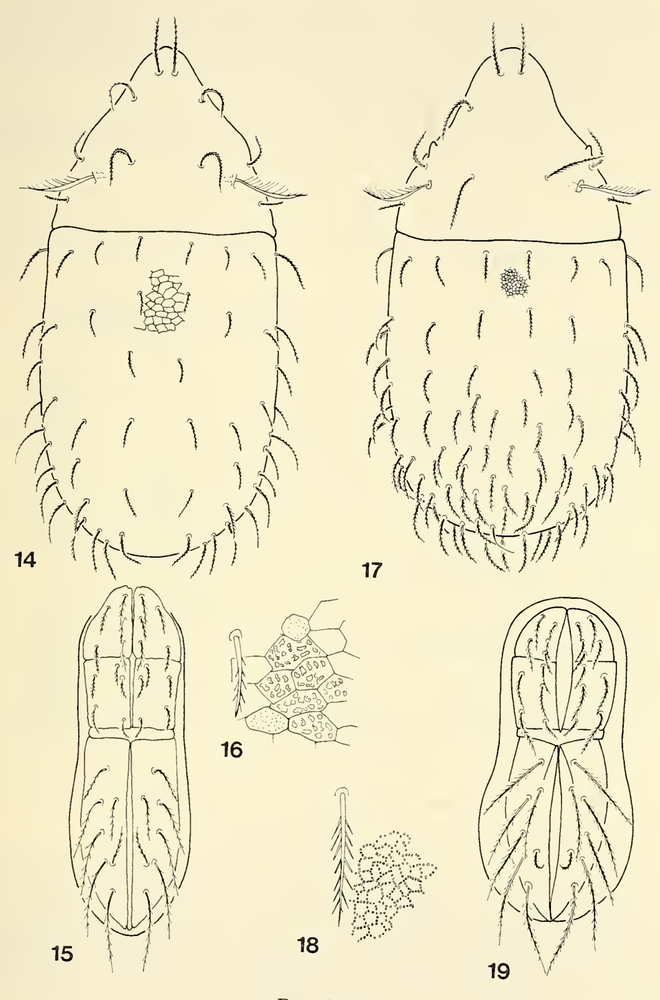
Dimensions: length: 745-754 μ, width: 356-369 μ.

Dorsal side (fig. 17): Entire surface of body, including epimeral region, anal plate, etc., ornamented with a dense and uniformly arranged polygonal sculpture (fig. 18), formed by minute grains. No pore fields present. Prodorsal setae densely ciliate. Notogaster with strong neotrichy, all hairs slightly longer and their cilia also longer than in the preceding species.

---

[1] There is a great similarity among the species relegated to the genera *Vepracarus* and *Cryptacarus*, with a difference present only in the distinctness of the anal and adanal plates. However, this is uncertain in the new species: all specimens clearly exhibit the long section of the sutural fusion!

[2] On the basis of specimens deriving from Western Samoa, Hammer described *Neotrichacarus* gen. n. *plumosus* sp. n., standing very near to *Heptacarus* Piffl, 1963, and to *Heptacarus reticulatus* sp. n., described below. The single difference consists of the 2 or 4 pairs of hairs originating on the infracapitulum. In the two species discussed here, there were invariably 4 pairs present.



FIGS. 14-19.

Heptacarus piffli sp. n.,
14: dorsal side, 15: anogenital region, 16: dorsal sculptur.

Heptacarus reticulatus sp. n.,
17: dorsal side, 18: dorsal sculptur, 19: anogenital region.

Ventral side: Infracapitulum with 4 pairs of setae. No epimeral neotrichy. All hairs of anogenital region ciliate (fig. 19). A considerable difference in size among the 10 pairs of setae of genital plate. Among anal hairs, the pair originating at the end of body only about one-third as long as the other pair, this latter hardly shorter than adanal setae. Adanal setae of equal length.

Examined material: 1 ex. (Holotype): As-73/7; 4 ex. (Paratypes: 1 imago and 3 nymphs): data as for holotype. Holotype and 2 paratypes (nymphs) deposited in the Muséum d'Histoire naturelle, Genève; 2 paratypes (imago and nymph (0-1360-74, 0-1361-74) in the Hungarian Natural History Museum, Budapest.

Remarks: Two species (from Egypt and Chad) were known so far in the genus *Heptacarus* Piffl, 1963. Of the new species, *H. piffli* stands near *H. notoneotrichus* Piffl, 1963, and *H. reticulatus* to *H. hirsutus* Wallw., 1964. The four species may be keyed out as follows:

1 (4) Dorsal and ventral sides of body with delimited pore fields, differing from the normal sculpture; anterior and posterior anal setae approximately equal in length

2 (3) Notogaster with weak pygidial neotrichy. All hairs well discernibly ciliate. Notogaster with polygonal sculpture. Adanal hairs, especially ad_1 and ad_2, considerably longer than anal hairs.—Indonesia . . . . *piffli* sp. n.

3 (2) Notogaster without neotrichy. Notogastral hairs not smooth, but very finely granulous. No polygonal sculpture discernible. Anal and adanal hairs equal in length.—Egypt . . . . *notoneotrichus* Piffl, 1963

4 (1) Pore fields absent, dorsal and ventral surfaces with a uniform fine sculpture. Between anterior and posterior anal hairs with a difference double in length.

5 (6) Body surface evenly punctate. Anal hairs, thus also anterior one (essentially longer than posterior one), merely one-third of even shortest adanal hair.—Chad . . . . *hirsutus* Wallwork, 1964

6 (5) Body surface ornamented with a definite polygonal sculpture, polygons small and densely spaced. Anterior anal hair approximately as long as shortest adanal hair *(ad_5)*.—Indonesia . . . . *reticulatus* sp. n.

Eremaeozetes costulatus sp. n. (fig. 20-21)

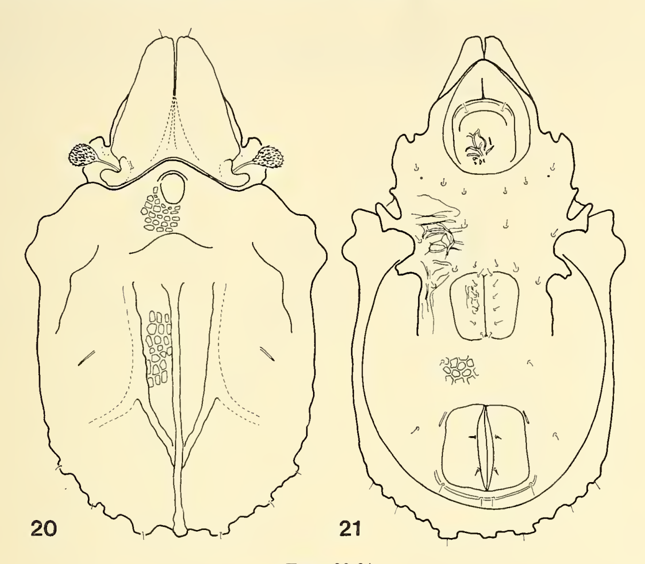
Dimensions: length: 487-505 μ, width: 284-299 μ.

Dorsal side (fig. 20): Lamellae comparatively narrow, their lateral margins straight, their surfaces with longitudinal rugosity, their cuspides bearing thin, minute rostral hair. Sensillus clavately incrassate. Minute interlamellar hair originating immediately near bothridium. Notogastral surface with a network of chitinous thickenings, elevated like ribs; surface with a rough polygonal sculpture. Posterior margin of body with sone elevated, robust tubercles. All notogastral hairs minute, only those arising on posterior margin of body discernible.

Ventral side (fig. 21): Epimeral region with irregularly decurrent, fusing transverse rugae. Base of epimeral hairs surrounded by a small chitinous ring. Anogenital region with polygonal sculpture. 6 pairs of genital, 1 pair of aggenital, 2 pairs of anal, and 3 pairs of adanal hairs discernible.

Examined material: 1 ex. (Holotype): As-73/2; 2 ex. (Paratypes): data as for holotype. Holotype and 1 paratype deposited in the Muséum d'Histoire naturelle, Genève; 1 paratype (0-1347-74) in the Hungarian Natural History Museum, Budapest.

Remarks: The genus *Eremaeozetes* was based by Berlese on a species deriving from Java. The known species are distinguishable mainly by their dorsal sculpture. The new species is characterized by the robust longitudinal thickenings and the polygonal sculpture of the notogaster, features hitherto unknown in its congeners.



Figs. 20-21.

Eremaeozetes costulatus sp. n.,
20: dorsal side, 21: ventral side.

Eremulus berlesei sp. n. (fig. 22-25)

Dimensions: length: 367-378 μ, width: 228-239 μ.

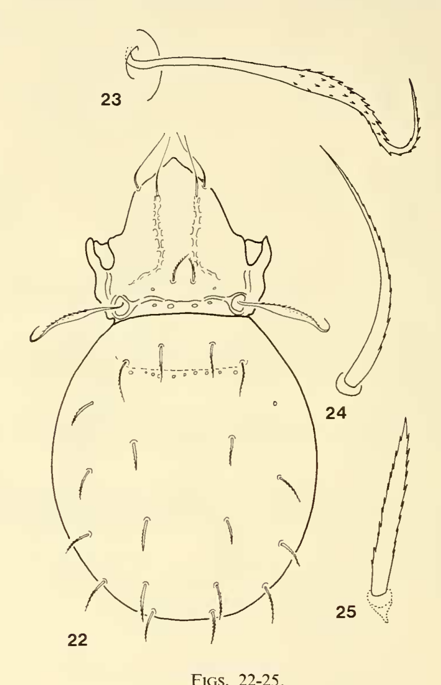
Dorsal side (fig. 22): Rostrum conical, costulae robust, their apically borne lamellar hairs long, projecting beyond rostrum. Interlamellar setae short, slightly ciliate. Interlamellar region with some chitinous rings, anterior margins fusing into a weak transverse lath. Sensillus (fig. 23) characteristically curved, medially considerably incrassate. Anterior depression of notogaster well recognizable, but posterior margin with only some scattered foveolae. Notogastral hairs short, squat, ciliate, excepting setae *ta* (fig. 24, 25) and *te*.

Ventral side: Hairs 1*a*, 1*b*, 2*a*, 3*a*, 3*b*, 3*c*, 4*a*, 4*b*, 4*c* of epimeral region stelliform, hair 1*c* robust, long. A transverse band of foveolae before genital opening. Adanal hairs

also stelliform, the six pairs of genital, aggenital, ad_1, and anal hairs normal, this latter thicker than the others.

Examined material: 1 ex. (Holotype): As-73/8; 2 ex. (Paratypes): data as for holotype. Holotype and one paratype deposited in the Muséum d'Histoire naturelle, Genève; one paratype (0-1353-74) in the Hungarian Natural History Museum, Budapest.

The new species is respectfully dedicated to Dr. A. Berlese, the founder of modern acarology.



Figs. 22-25.

Eremulus berlesei sp. n.,
22: dorsal side, 23: sensillus, 24: hair *ta*, 25: hair *ms*.

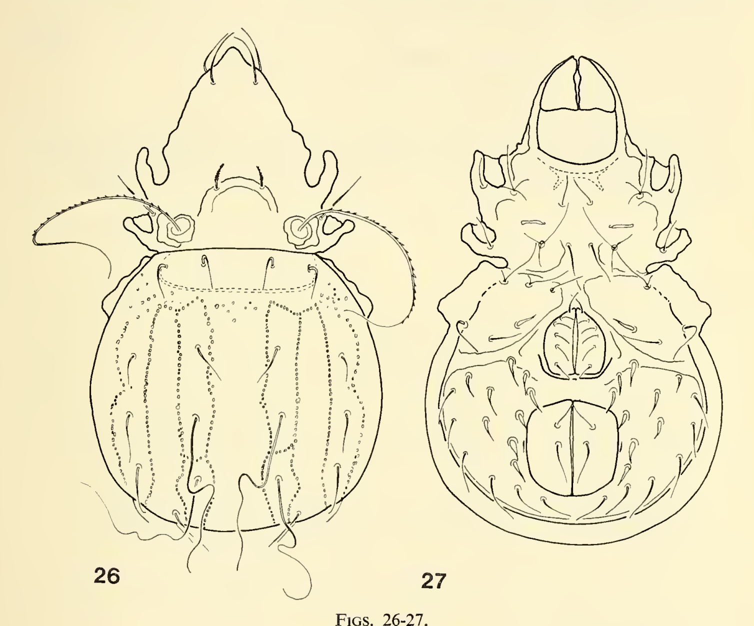
Remarks: Several species of the genus are already known from the Oriental Region, with *E. avenifer* Berlese, 1913, standing nearest to the new species. Without an examination of its type, and with recourse only to the original short description and the figure published by Berlese, I was unable to identify the new species as *E. avenifer* Berl., because its sensillus is considerably longer, especially its attenuating and recurving apical section, its dorsal hairs—though short—show different proportions in length (e.g. ps_1 is approximately twice as long as the hairs *ta* or *te*, while in the new species these latter are the longer ones, and also their positions differ). Hammer (1972) identified

specimens collected on Tahiti with BERLESE's species, but also with some doubts. It seems that her specimens stand between the two treated here and that neither one is identical with the species described by BERLESE.

Eremobelba heterotricha sp. n. (fig. 26-27)

Dimensions: length: 502-526 μ, width: 297-312 μ.

Dorsal side (fig. 26): Rostrum conical, rostral and lamellar hairs adjacent, originating on rostrum, both of equal length, smooth. Interlamellar region with a semicircular, contiguous arc formed by a chitinous thickening, bearing short, incrassate, and



FIGS. 26-27.
Eremobelba heterotricha sp. n.,
26: dorsal side, 27: ventral side.

heavily ciliated interlamellar hairs. Exobothridial hairs long. Sensillus also unusually elongated, throughout with serriform scales. Notogastral cerotegument with polygonal sculpture, excepting a wide median field. Ten pairs of notogastral hairs, with two pairs long and flagellately curved, the rest considerably short and simple.

Ventral side (fig. 27): Epimeral region with some stelliform, anogenital region with some phylliform hairs.

Legs: claw of leg I essentially longer and thinner than that of legs II-IV.

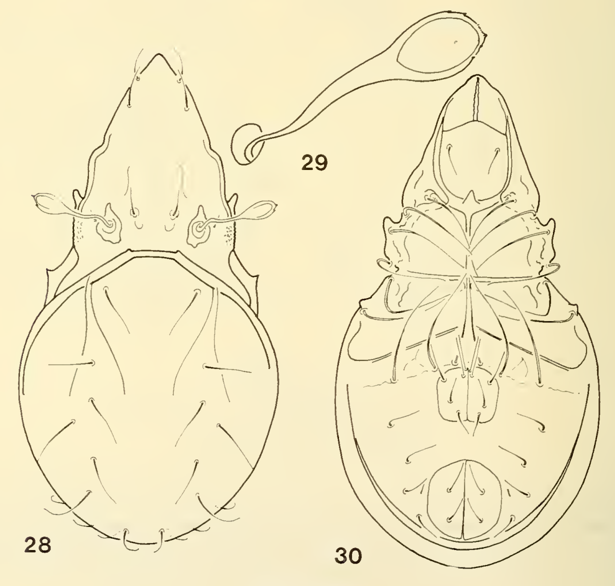
Examined material: 1 ex. (Holotype): As-73/1; 2 ex. (Paratypes): data as for holotype. Holotype and one paratype deposited in the Muséum d'Histoire naturelle, Genève; one paratype (0-1356-74) in the Hungarian Natural History Museum, Budapest.

Remarks: Of the *Eremobelba* Berlese, 1908, species with a polygonal cerotegument, only *E. brevista* Bal., 1968, and *E. pulchella* Bal. et Mah., 1969, show a notogastral neotrichy. In the former species, however, only the hairs *ta* and *te* are shorter and there are 8 pairs of elongately flagelliform setae, in the latter one 3 pairs, but only those on the posterior side of the body, the median 4 pairs being phylliform, whereas in the new species there are 2 pairs of long and 8 pairs of short hairs, and these latter are not phylliform. The arcuate lamellar costula is also characteristic.

Machuella zehntneri sp. n. (fig. 28-30)

Dimensions: length: 244-259 μ, width: 129-134 μ.

Dorsal side (fig. 28): Rostrum elongate, conical. Rostral and lamellar hairs adjacent, originating near rostrum. Interlamellar hair hardly shorter, with 2 adjacent foveolae in interlamellar region. Margin of bothridium heavily chitinized, before it also



FIGS. 28-30.

Machuella zehntneri sp. n.,
28: dorsal side, 29: sensillus, 30: ventral side.

a thin line discernible on prodorsal surface. Sensillus (fig. 29) shaped like a plum stone in lateral view, its anterior margin with some minute teeth, otherwise smooth. Anterior margin of notogaster slightly thinning medially; two thin chitinous lines decurrent near hair *ta*. Ten pairs of notogastral setae present, hairs r_1 and *p*s considerably shorter than the others.

Ventral side (fig. 30): Epimeral region with ten pairs of extremely long hairs (characteristic for the genus); entire surface covered with a secretion layer. Genital and anal plates large. Genital hairs, especially those originating on anterior margin of plate, extremely long, longer even than width of plate! Also anal and adanal setae long, position of latter ones characteristic for the genus.

Examined material: 1 ex. (Holotype): As-73/6; 23 ex. (Paratypes): data as for holotype. Holotype and 14 paratypes deposited in the Muséum d'Histoire naturelle, Genève; 9 paratypes (0-1359-74) in the Hungarian Natural History Museum, Budapest.

Remarks: Six species and two forms of the genus are now known. If the descriptions and the published figures are correct, they are easily separable by the following key:

1 (2) Notogastral hairs aligned in a longitudinal row, one behind the other. Line (or lines) decurrent posterior from dorsosejugal suture absent . . . . *lineata* Hammer, 1973

2 (1) Notogastral hairs not aligned in a longitudinal row. Hairs *ta*, *te*, *ti* forming three points of a triangle.

3 (4) Anterior to genital plate, a single row of 8 pairs of hairs directed towards rostrum . . . . *draconis* Hammer, 1961

4 (3) Anterior to genital plate, only 4 pairs of hairs arising in a single row.

5 (10) Two thin lines decurrent posterior on each side of dorsosejugal suture.

6 (9) Genital hairs short, only as long as one-fourth width of genital plate.

7 (8) Interlamellar hairs minute, considerably shorter than distance between their points of insertion and bothridium . . . . . *pyriformis* Hammer, 1968

8 (7) Interlamellar hairs long, their length approximately equalling their enclosed distance, and considerably longer than distance between their points of insertion and bothridium . . . . *ventrisetosa robusta* Hammer, 1971 [1]

9 (6) Genital hairs extremely long, longer than width of genital plate . *zehntneri* sp. n.

10 (5) One thin line decurrent posterior on each side of dorsosejugal suture . . . . *ventrisetosa* Hammer, 1961

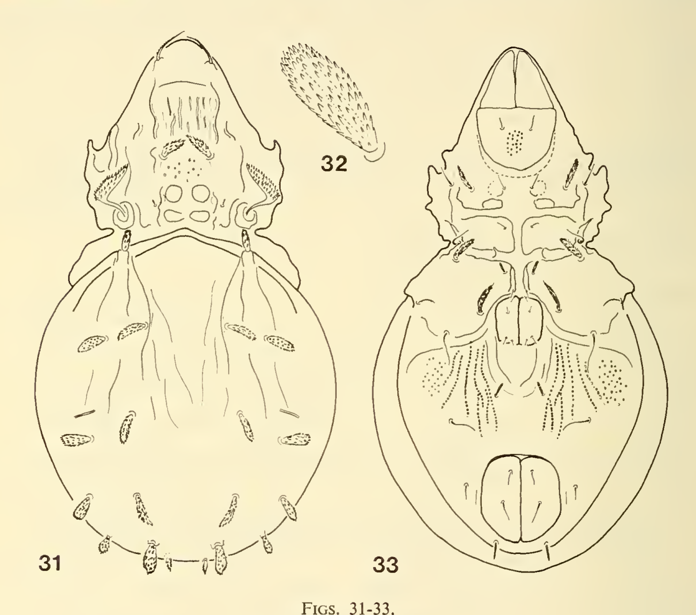
This new species is dedicated to the memory of the pioneer of tropical applied entomology in Java, Leo Zehntner (see Hauser 1972).

[1] The taxon described as merely a variety by Hammer merits, when studying the intra-specific differences among the species relegated to the genus, at least subspecific rank in my opinion. The key submitted above is based only on the descriptions, the differences between the species are meagre and it is quite possible that a thorough revision will result in the sinking of the majority of species to some lower rank or in downright synonymies.

Striatoppia hammeni sp. n. (fig. 31-33)

Dimensions: length: 216-228 μ, width: 108-117 μ.

Dorsal side (fig. 31): Rostral hair originating from a small protuberance, lamellae hardly recognizable. Lamellar setae thickened, interlamellar hairs minute. Anterior to lamellar hairs some longitudinal chitinous ribs present, interlamellar region with 2 pairs of large foveolae. Sensillus generically characteristic, aciculate. Notogastral setae widened, phylliform (fig. 32), setae *ta* and ps_1 considerably shorter than the rest, hair *ta* discernibly ciliate.



Figs. 31-33.

Striatoppia hammeni sp. n.,
31: dorsal side, 32: hair *ti*, 33: ventral side.

Ventral side (fig. 33): Epimeral region with 1*b*, 3*b* and 4*a* very robust, ciliate, hairs 2*a* and 3*a* also slightly ciliate. Five pairs of minute genital hairs. Anogenital region with longitudinal rugae resembling strings of pearls owing to secretion globules. Aggenital hairs, ad_1 and ad_2 rigid slightly incrassate, ad_3 thin, simple, normal.

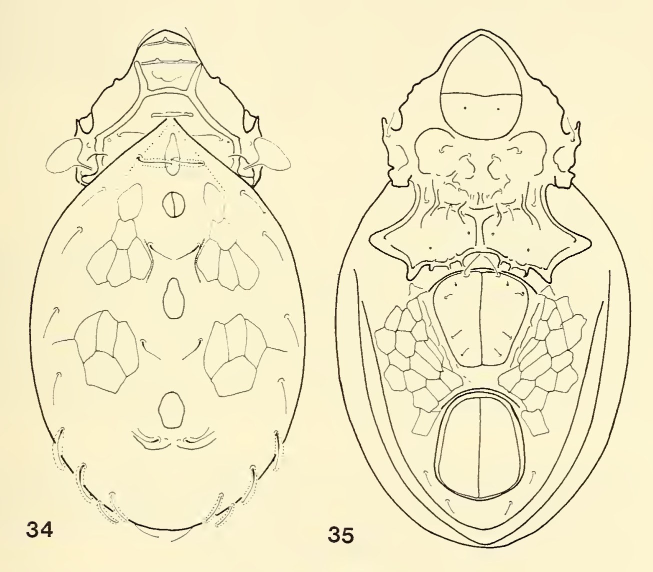
Examined material: 1 ex. (Holotype): As-73/10; 10 ex. (Paratypes): data as for holotype. Holotype and 6 paratypes deposited in the Muséum d'Histoire naturelle, Genève; 4 paratypes (0-1357-74) in the Hungarian Natural History Museum, Budapest.

Remarks: The new species stands near *St. opuntiseta* Bal. et Mah., 1968, from Java and Malaysia, and to *St. lanceolata* Hammer, 1972, from Tahiti. It can be separated easily from the former one by its thinner and longer lamellar and notogastral hairs and principally by the thin, arcuate ad_3, from the latter by the same features and the length and shape of the hairs *ag*, 1*b*, 3*b*, and 4*a*.

The new species is dedicated to Dr. van der Hammen, Leiden.

Licneremaeus novaeguineae Balogh, 1968 (fig. 34, 35)

The Indonesian specimens agree in every respect with the above species described by Balogh from New Guinea. In 1930 Willmann described from Guatemala a highly similar species under the name *L. discoidalis*, but the type-material has, as far as I know,



Figs. 34-35.
Licneremaeus novaeguineae Bal., 1968,
34: dorsal side, 35: ventral side.

perished. Recently Hammer described *L. polygonalis* Hammer, 1971, from the Fiji Islands, but failed to mention Balogh's extremely similar species in the differential diagnosis. These three nominate species stand so near to one another, that their separation needs further study.

For the sake of an eventual identification, I submit a figure of the specimens originating from the Komodo Island.

Nixozetes gen. n.

Diagnosis: Family Haplozetidae. Pteromorphae linguiform, movable. Lamellae wide, large. Sensillus setiform. recurving. Ten pairs of notogastral hairs, 4 pairs of sacculi, a rough notogastral sculpture. Five pairs of genital, 1 pair of aggenital, 2 pairs of anal, and 3 pairs of adanal hairs; hair ad_3 in preanal position. All strongly ciliate. Anal plate with extremely strong, protruding, longitudinal chitinous thickenings. Legs monodactyle.

Type-species: *Nixozetes javanus* sp. n.

Remarks: The species *Cosmobates brevisetus* Bal., 1970, and *C. gregoryi* Bal., 1970, described from New Guinea, are hereby also relegated to the new genus. The genus *Cosmobates*, known from Africa, has 4 pairs of genital hairs, the legs are tridactylous, the sensillus is penicillate, and it lacks the characteristic chitinous incrassation of the anal plate. The new species and the two other ones mentioned above differ in such fundamental features, given in the diagnosis above, that their relegation to, and the according establishment of, a new genus is wholly justified.

Nixozetes javanus sp. n. (fig. 36-40)

Dimensions: length: 600-729 μ, width: 421-510 μ.

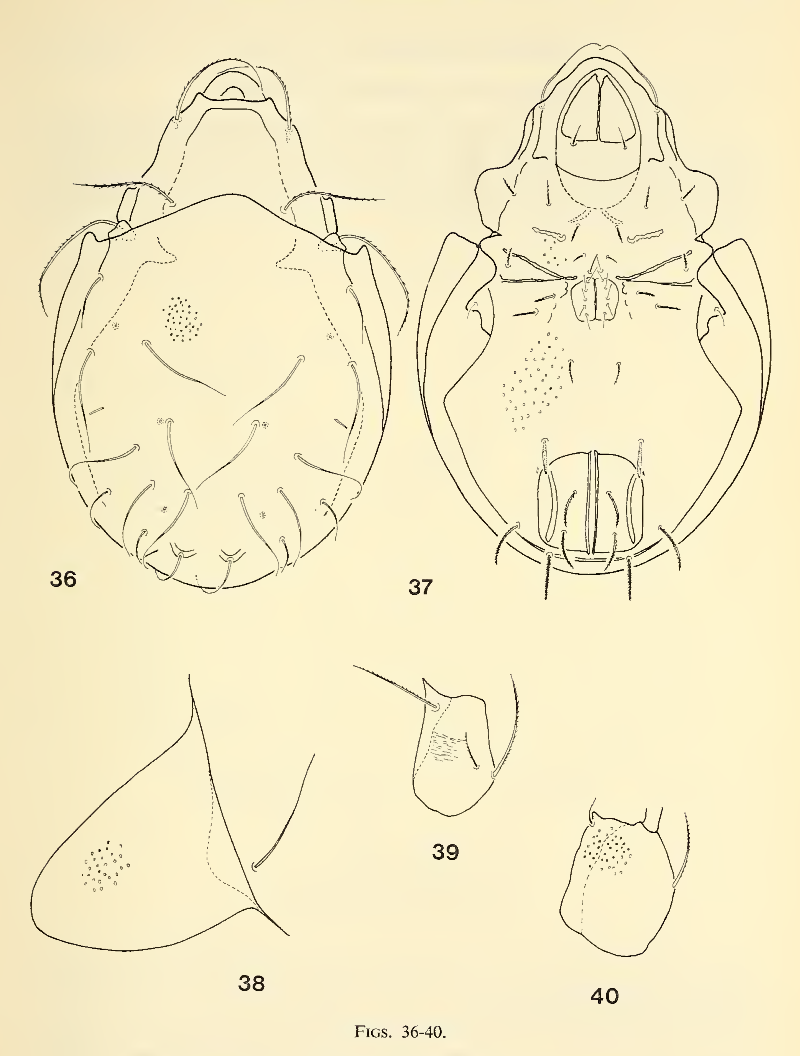
Dorsal side (fig. 36): Rostrum widely rounded, rostral hairs thin, their insertional point visible in a lateral view only. Lamellae wide, beyond insertion point of lamellar hair continuing towards rostrum. terminating without a cuspis, forming a wide translamella. Lamellar and interlamellar setae extremely long, thin, ciliate. Interlamellar region weakly punctate. Sensillus setiform, ciliate, characteristivally reclinate towards end of body. Before posterior margin of body, a pair of strong chitinous thickenings present. Notogaster densely foveolate. Ten pairs of variously long notogastral hairs. Sacculi minute. Pteromorpha linguiform (fig. 38), with foveolae smaller than on notogaster.

Ventral side (fig. 37): Surface also foveolae. Apodemes narrow, hardly recognizable. Epimeral setal formula: 3-1-2-3 (?). All hairs weakly ciliate, together with the 5 pairs of genital hairs, while the one pair of aggenital, 2 pairs of anal and 3 pairs of adanal setae heavily, nearly plumosely ciliate. Anal plate with a robust chitinous crest, and also opposite inner rims of the plates slightly thickened.

Legs: All monodactylous. Lower rim of all femora (3. and 4.: fig. 39-40) with an edge terminating in a sharp tooth.

Examined material: 1 ex. (Holotype: As-73/12; 8 ex. (Paratypes): data as for holotype. Holotype and 5 paratypes deposited in the Muséum d'Histoire naturelle, Genève; 3 paratypes (0-1348-74) in the Hungarian Natural History Museum, Budapest.

Remarks: The new species can be distinguished from its two congeners mentioned in the general diagnosis by the wide translamella, the chitinous incrassations on the posterior margin of the notogaster, and the diverse lengths of the notogastral hairs.



Figs. 36-40.

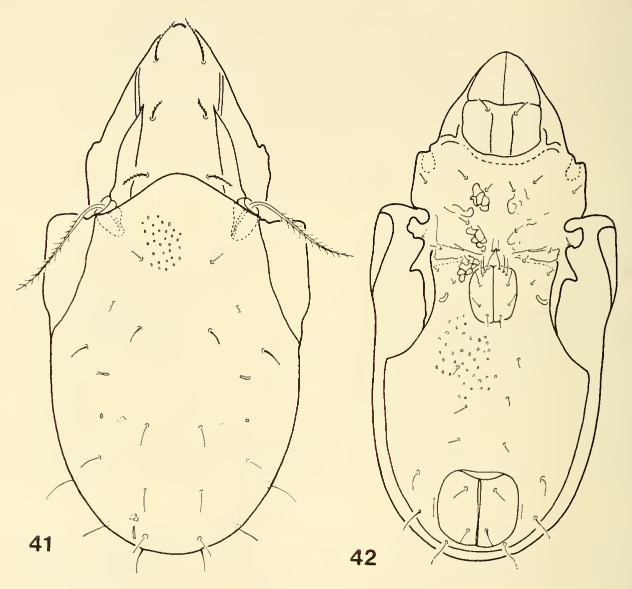
Nixozetes javanus sp. n.,

36: dorsal side, 37: ventral side, 38: pteromorpha from lateral side,
39: femur of leg III, 40: femur of leg IV.

Pilobatella schauenbergi sp. n. (fig. 41-42)

Dimensions: length: 348-407 μ, width: 188-212 μ.

Dorsal view (fig. 41): Rostrum conical, rostral hair arising on its dorsal surface, the longest of all prodorsal setae. Lamellar hair slightly shorter than interlamellar hair, originating removed from and between lamellar apices. All three pairs heavily ciliate. Sensillus long, thin, setiform but heavily ciliate. Ten pairs of thin, simple notogastral hairs present; sacculi minute, *Sa* slit-shaped.



Figs. 41-42.

Pilobatella schauenbergi sp. n.,
41: dorsal side, 42: ventral side.

Ventral side (fig. 42): Epimeral region with weak polygonal sculpture. Apodemes narrow, hardly recognizable. 6 pairs of genital, 3 pairs of aggenital, 2 pairs of anal, and 3 pairs of adanal setae present.

Examined material: 1 ex. (Holotype): As-76-6; 3 ex. (Paratypes): data as for holotype. Holotype and 2 paratypes deposited in the Muséum d'Histoire naturelle, Genève; 1 paratype (0-1352-74) in the Hungarian Natural History Museum, Budapest.

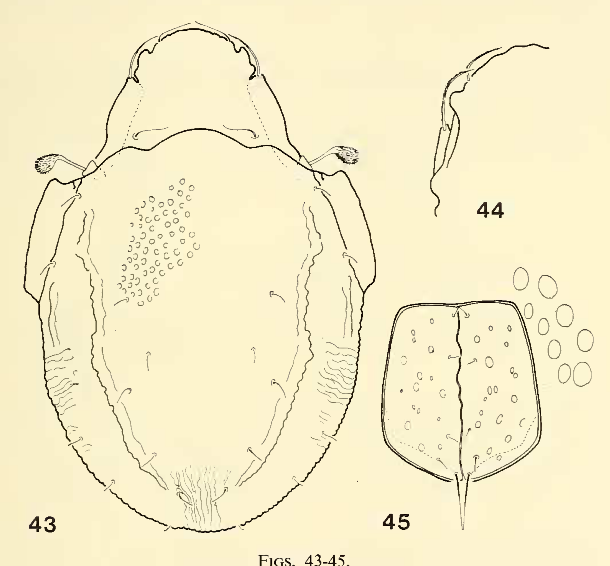
Remarks: This is the second species relegable to the genus *Pilobatella* Bal. et Mah., 1967, described from the Congo region; it differs from the type-species by the

shape and position of the rostral, lamellar and interlamellar hairs, and in the shape of the sensillus.

Rostrozetes komodensis sp. n. (fig. 43-45)

Dimensions: length: 364-386 μ, width: 260-273 μ.

Dorsal side (fig. 43): Rostrum incised, tripartite, tutorial tooth large, laterally rounded (fig. 44). Lamellar cuspis triangular, lamellar hair essentially longer than rostral hair, originating from cuspidal apex. Interlamellar hairs short. Sensillus with incrassate and aciculate clavus. Notogastral margins with two incrassate, convex cristae; median surface foveolate, foveolae approximately round, their margins definite. Area between crista and body margin with rough rugae. Notogastral hairs thin, short.



Figs. 43-45.

Rostrozetes komodensis sp. n.,

43: dorsal side, 44: prodorsum from dorso-lateral view, 45: genital plate.

Ventral side: Excepting genital plates, entire surface ornamented with foveolae, similar to those of notogaster. Genital plates with partly irregularly shaped foveolae of various size (fig. 45). All hairs, excepting hair 1 of genital plate, extremely short, hardly recognizable owing to the foveolae.

Examined material: 1 ex. (Holotype): As-73/7; 1 ex. (Paratype): data as for holotype. Holotype deposited in the Muséum d'Histoire naturelle, Genève; paratype (0-1355-74) in the Hungarian Natural History Museum, Budapest.

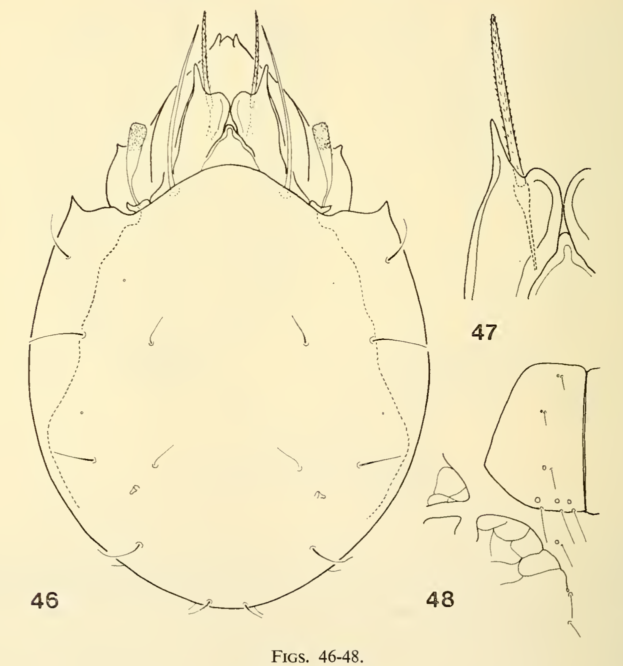
Remarks: By the crista decurrent along the body margin, the new species belongs to the alliance of *R. carinatus* Beck, 1965. In this relationship, however, the interlamellar hairs of *R. carinatus* and of *R. cristatus* Bal. et Mah., 1969, are long, while *R. monstruosus* Bal. et Mah., 1969, also possesses a longitudinal median crista, and thus the new species is satisfactorily distinct from these species.

Lamellobates hauseri sp. n. (fig. 46-48)

Dimensions: length: 275-285 μ, width: 182-187 μ.

Dorsal side (fig. 46): Rostrum tripartite, the two lateral teeth slightly longer than the median tooth. Inner cuspides of lamellae convexly rounded, outer ones extremely long and narrow. Lamellar hairs obtuse, interlamellars attenuating, both pairs heavily ciliate. Sensillus spatulate, densely ciliate. Nine pairs of diversely long notogastral hairs present.

Ventral side: Highly similar to *L. palustris* Hammer, 1958. Epimeral region (fig. 48) with a weak polygonal sculpture. Six pairs of genital hairs, first three pairs



Figs. 46-48.

Lamellobates hauseri sp. n.,

46: dorsal side, 47: cuspis of lamella, 48: genital plate.

situated along a transverse line, near anterior margin; 1 pair of aggenital, 2 pairs of anal, and 2 pairs of adanal hairs also present.

Examined material: 1 ex. (Holotype): As-73/8; 1 ex. (Paratype): data as for holotype; 1 ex. (Paratype): As-73/3. Holotype and one paratype deposited in the Muséum d'Histoire naturelle, Genève; one paratype (0-1346-74) in the Hungarian Natural History Museum, Budapest.

Remarks: From the Oriental Region, Csiszár has already described a *Lamellobates* species (Java), and also *L. palustris* Hammer, 1958, is known from Thailand. However, the new species differs from the among others by its extremely long outer lamellar cuspides.

I dedicate the new species to my dear friend Dr. B. Hauser, Keeper of the Arthropodan Collections of the Geneva Museum, whose help enabled the study of the extremely interesting material.

Paralamellobates ceylanicus (Oudemans, 1915)

The single specimen, originating from Indonesia (Krakatau Island) is wholly identifiable with the well described and illustrated Oudeman's species. Having examined the type-specimen of *P. shoutedeni* Balogh, 1959, deposited in the Hungarian Natural History Museum, Budapest, and finding it completely identical with the above specimen, I am sure that the two nominal species represent the same taxon.

REFERENCES

Aoki, J. 1965. Oribatiden (Acarina) Thailands. 1. *Nature Life S.E. Asia* 4: 130-193.

— 1966. Studies on the Oribatid Mites of Japan. II. *Trichthonius simplex* spec. nov. *Bull. natn. Sci. Mus. Tokyo* 9: 1-7.

Balogh, J. 1968. New Oribatids (Acari) from New Guinea. *Acta zool. hung.* 14: 259-285.

— 1970. New Oribatids (Acari) from New Guinea II. *Acta zool. hung.* 16: 291-344.

— 1972. The Oribatid Genera of the World. *Akadémiai Kiado, Budapest*, pp. 188 + 71 pl.

Balogh & S. Mahunka. 1967. The Scientific Results of the Hungarian Soil Zoological Expeditions to the Brazzaville-Congo. 30. The Oribatid Mites (Acari) of Brazzaville-Congo, II. *Opusc. zool. Bpest.* 7: 35-43.

— 1968. Some New Oribatids (Acari) from Indonesian Soils. *Opusc. zool. Bpest.* 8: 341-346.

— 1969. The Zoological Results of the Hungarian Soil Zoological Expeditions to South America. 11. Acari: Oribatids from the Material of the Second Expedition, II. *Opusc. zool. Bpest.* 9: 31-69.

Beck, L. 1962. Beiträge zur Kenntnis der neotropischen Oribatidenfauna 1. Eohypochthonius und Cosmochthonius (Arach., Acari). *Senckenberg. biol.* 43: 227-236.

Csiszár, J. 1961. New Oribatids from Indonesian Soils (Acari). *Acta zool. hung.* 7: 345-366.

Grandjean, F. 1954. Les Enarthronota (Acariens) (4e série). *Annls. Sci. nat. Zool.* 11: 311-335.

Hammen, van der, L. 1959. Berlese's primitive Oribatid mites. *Zool. Verh. Leiden* 40: 1-93.

Hammer, M. 1968. Investigations on the Oribatid Fauna of New Zealand. Part III. *Biol. Skr.* 16, 2: 6-96, Tbl. 33.

— 1972. Investigations on the Oribatid Fauna of Tahiti, and on some Oribatids found on the Atoll-Rangiroa. *Biol. Skr.* 19, 3: 3-67.

Hauser, B. 1972. Leo Zehntner: La saga d'un savant suisse. *Musées Genève*, nº 127: 2-5.

OUDEMANS, A. C. 1917. Notizen über Acari, 25. Reihe. *Arch. Naturgesch.* 82: 1-84.

PIFFL, E. 1963. Heptacarus notoneotrichus eine neue Hornmilbe aus Aegypten (Oribatei-Lohmanniidae). *Anz. öst. Akad. Wiss.* 100: 24-31.

SELLNICK, M. 1925. Javanische Oribatiden. *Treubia* 6: 459-475.

WALLWORK, J. A. 1960. Some Oribatei from Ghana. I. Sampling Localities. II. Some members of the Enarthronota Grandj. *Acarologia* 2: 368-388.

— 1964. Some Oribatei (Acari: Cryptostigmata) from Tchad (1st series). *Revue Zool. Bot. afr.* 70: 353-385.

Author's address:

Dr. Sandor Mahunka
Zoologische Abteilung des Ungarischen Naturwissenschaftlichen Museums
Baross utca 13
H-1088 Budapest
Hungary